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Smart Lab Renovation in TA 35-0213

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Abstract

For this project, the PADCAP student based integrated project team (IPT) is following the Smart Lab Initiative created by University of California Irvine (UCI). The IPT will be working on implementing this program into TA 35-0213 (Target Fab). Target Fab crucially requires upgrades for the continuation of critical mission work conducted within its walls. By analyzing fume hoods, the IPT hopes to improve the facility by making energy efficiency decisions.

Smart Lab Components

BAS

1. Fundamental platform of dynamic, digital control systems.
2. Commissioning with automated cross platform fault detection.

HVAC

3. Demand-based ventilation.
4. Exhaust fan discharge velocity optimization.
5. Pressure drop optimization.
6. Fume hood flow optimization.

Lighting

7. Low power density, demand based lighting.

TA-35-0213 Smart Lab Upgrade Phases

1: Maintenance on ventilation systems

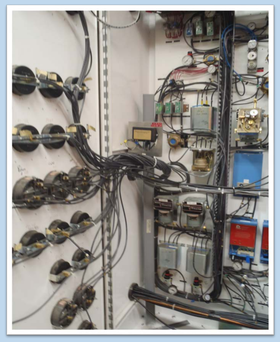
2: BAS upgrades

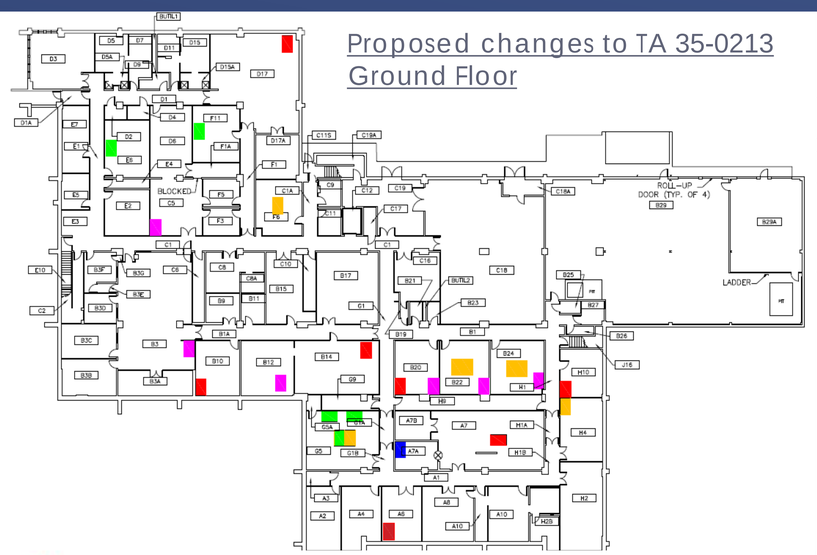
3: Chiller and condenser upgrades

4: Fume hood upgrades

Current Fume Hood Conditions

41 Total Fume Hoods on an old BAS
24 Failed and/or unused fume hoods.
→ Lined with asbestos and legacy waste.
19 Outdated auxiliary fume hoods:
→ Blows untampered outside air in front of fume hood.
→ Constant Air Volume wastes energy.





Upgrades

Upgrades to Target Fab will include removal and installation of new fume hoods as well as hibernating or retrofitting fume hoods in order to decrease the buildings energy consumption.

Fume hoods being Removed: 23

Fume hoods being Hibernated: 1

Fume hoods being Retrofitted: 7

Fume hoods being installed: 16

Rough Order of Magnitude (ROM):

$20.3 Million

Total Lost Productivity

Due to an estimated total of 20 fume hoods not being used is resulting in a estimated total of **$2.5 Million** in lost productivity per year

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